

**MODERN  
DICTIONARY  
of  
ELECTRONICS**

SEVENTH EDITION  
REVISED AND UPDATED

**Rudolf F. Graf**


Exhibit D - Page 13



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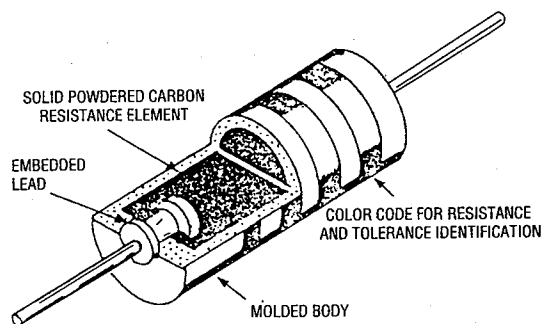
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**carbon brush — Cardew voltmeter**

carbon vapor. High-intensity arcs use cored carbons, the core being filled with the oxides of thorium and cerium, which radiate brightly when heated.

**carbon brush**—A current-carrying brush made of carbon, carbon and graphite, or carbon and copper.

**carbon-composition resistor**—Hot- or cold-molded fixed resistor made from mixtures of granulated carbon and ceramic binder. In some versions the composition forms a monolithic structure; in others the composition is thickly applied to a ceramic core. Hot-molded carbon-composition resistors are specified where low-cost, reliable resistors with tolerances of  $\pm 5$  and  $\pm 10$  percent are acceptable.



*Carbon-composition resistor.*

**carbon-contact pickup**—A phonograph pickup that depends for its operation on the variation in resistance of carbon contacts.

**carbon-film resistor**—1. A resistor formed by vacuum-depositing a thin carbon film on a ceramic form. 2. Carbon-film resistors are general-purpose, low-cost types with axial leads. Specification characteristics generally match those of carbon-composition resistors but at a lower cost.

**carbonize**—To coat with carbon.

**carbonized filament**—A thoriated-tungsten filament treated with carbon. A layer of tungsten carbide formed on the surface slows down the evaporation of the active emitting thorium and thus permits higher operating temperatures and much greater electron emission.

**carbonized plate**—An electron-tube anode that has been blackened with carbon to increase its heat dissipation.

**carbon microphone**—A microphone that depends for its operation on the variation in resistance of carbon contacts.

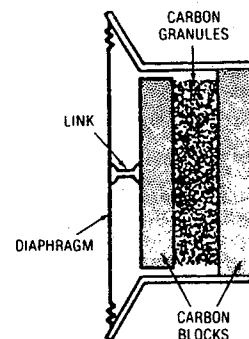
**carbon-pile regulator**—An arrangement of carbon discs whose series resistance decreases as more pressure or compression is applied.

**carbon resistor**—Also called composition resistor. A resistor consisting of carbon particles that are mixed with a binder molded into a cylindrical shape, and then baked. Terminal leads are attached to opposite ends. The resistance of a carbon resistor decreases as the temperature increases.

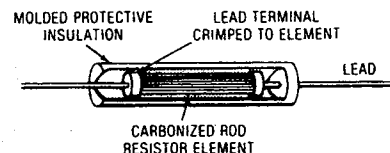
**carbon transfer recording**—A type of facsimile recording in which carbon particles are deposited on the record sheet in response to the received signal.

**Carborundum**—A compound of carbon and silicon used in crystals to rectify or detect radio waves.

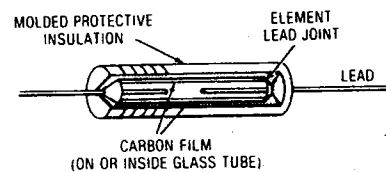
**carcinotron**—A voltage-tuned, backward-wave oscillator tube used to generate frequencies ranging from UHF up to 100 GHz or more.



*Carbon microphone.*



*Composition type.*



*Deposited-film type.*

*Carbon resistor.*

**card**—Nonpreferred term for printed circuit board. See printed circuit board.

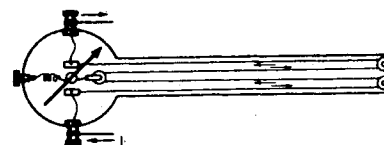
**card bed**—A mechanical device for holding punch cards to be transported past the punching and reading stations.

**card code**—An arbitrary code in which holes punched in a card are assigned numeric or alphabetic values.

**card column**—One of 20 to 90 single-digit columns in a tabulating card. When punched, a column contains only one digit, one letter, or one special code.

**card-edge connector**—Also called edgeboard connector. A connector that mates with printed wiring leads running to the edge of a printed circuit board.

**Cardew voltmeter**—The earliest type of hot-wire instrument. It consisted of a small-diameter platinum-silver wire sufficiently long to give a resistance high enough to be connected directly across the circuit being measured. The wire was looped over pulleys and it expanded as current flowed, causing the pointer to rotate.



*Cardew voltmeter.*

**cdi — cellular system**

**cdi**— Abbreviation for collector-diffusion isolation.

**CD-I**— Abbreviation for compact disc-interactive. A home entertainment system based on a player that connects to any TV and stereo system, with information stored digitally on compact disc. It was introduced by Philips Consumer Electronics in 1991.

**C-display**— A type of radar display in which the signal is a bright spot, with the bearing as the horizontal coordinate and the elevation angle as the vertical coordinate.

**CDMA**— Abbreviation for code-division multiple access. Digital cellular system multiple-access standard that allows for higher capacity and greater security. Stations use spread-spectrum modulations and orthogonal codes to avoid interfering with one another. *See also* code-division multiple access.

**CDPD**— Abbreviation for Cellular Digital Packet Data. A standards-based technology for wireless communication of data.

**CD-R**— Abbreviation for compact disc-recordable (recordable CD). Same as CD-WO. CD format is compatible with CD-ROM and can be written to once and read many times.

**CD-ROM**— Abbreviation for compact disc-read-only memory. 1. A compact disc with a format for storing different types of information digitally, which can be played on a CD-ROM drive connected to a personal computer. 2. A compact 5-1/4-inch optical disc, typically used to store text, images, audio, video, and programs that can run on suitably equipped computers. CD-ROM drives come in single, double, and quad speeds (150 kbs, 300 Kbs, and 600 kbs, respectively). 3. A read-only optical disc capable of storing large amounts (up to 250,000 pages) of data.

**CD-ROM drive**— A peripheral device attached to a computer that allows it to read/play a CD-ROM disc. All CD-ROM players can also play back audio CDs, but require external headphones or speakers to hear them.

**CD-WO**— Compact disc-write once. Recordable compact disc. Same as CD-R.

**ceiling**— The maximum voltage that may be attained by an exciter under specified conditions.

**celestial guidance**— A system of guidance in which star sightings that are automatically taken during the flight of a missile provide position information used by the guidance equipment.

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**cell**— 1. A single unit that produces a direct voltage by converting chemical energy into electrical energy. 2. A single unit that produces a direct voltage by converting radiant energy into electrical energy; for example, a solar or photovoltaic cell. 3. A single unit that produces a varying voltage drop because its resistance varies with illumination. 4. Elementary unit of storage. 5. In corrosion processes, a source of electric potential that is responsible for corrosion. It consists of an anode and a cathode immersed in an electrolyte and electrically bonded together. The anode and cathode may be separate metals or dissimilar areas on the same metal. The different metals will develop a difference in potential that is accompanied by corrosion of the anode. When this cell involves an electrolyte, as it does in corrosion processes, it is referred to as an electrolytic cell. 6. The geographic area served by a single low-power transmitter/receiver. A cellular system's service area is divided into multiple cells.

**cell counter**— An electronic instrument used to count white or red blood cells or other very small particles.

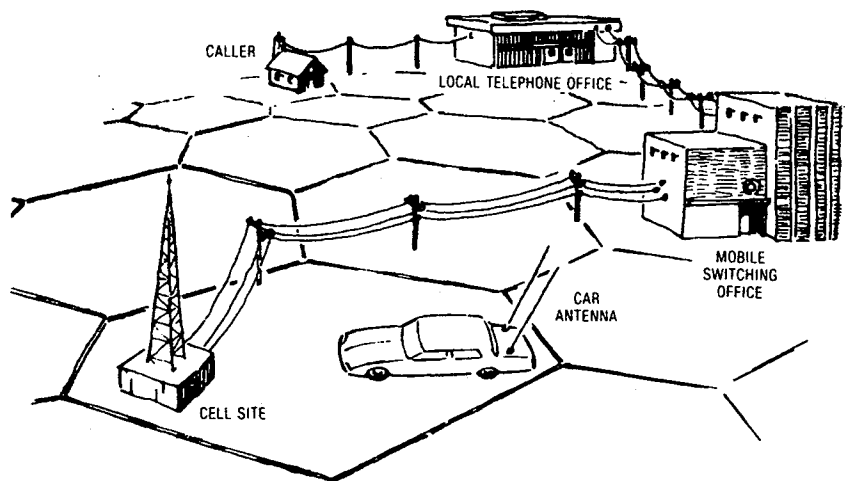
**cell-type enclosure**— A prefabricated basic shielded enclosure of double-walled copper-mesh construction. The original screen-room design.

**cell-type tube (tr, atr, and pre-tr tubes)**— A gas-filled radio-frequency switching tube that operates in an external resonant circuit. A tuning mechanism may be incorporated into the external resonant circuit or the tube.

**cellular**— Type of mobile telephone service in which the geographic serving area is divided into subregions (cells), each with its own antenna and switching node.

**cellular radio**— The terrestrial mobile telephone technology that increases the number of available channels by dividing an area into cells; each cell may use the same frequencies as other cells, except that adjacent cells may not use the same frequencies.

**cellular system**— 1. A mobile telephone system that divides large service areas into small cells, each with its own low-power transmitter. A telephone call is switched by computers from one transmitter to the next without interrupting the signal as a vehicle moves from cell to cell. Calls can be divided and frequencies reused over shorter intervals. 2. Method of mobile telephone service that divides radio communication service areas into small cells, or districts. The cellular approach



*Cellular telephone system.*

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utilizes low-power tra communications throu ment linking the cells. and standardizing servi improved mobile telep

**cellulose aceta** plastic film used as the ing tapes.

**cellulose-nitrate** Celsius tempera grade temperature sca the freezing point of w point defined as 100°C atmospheric pressure ( cent — A measure 100th of a semitone.

**center-fed ante** feeder wires are conne

**center feed**— 1. mission line to the ce 2. Connection of sign: a coil.

**center frequenc** 1. The average frequ modulated by a symm the center of a spect scanning). It is usua running frequency. T locked loop operates v (input) signal.

**centering contr** shift the position of th cathode-ray tube. The the image to the right control moves it up or

**centering diode**— types of plan-position

**centering magn** televised picture on t framing magnet.

**center of gravity** and around which all p

**center of mass**— point around which th as a system.

**center poise**— : varnishes.

**center ring**— Th an induction-motor hc attached to the ends of

**center tap**— A cc a winding, or midway resistor or other portio

**center-tapped in** tap at half the total inc

**center wire**— A tional counters as an a it to set the conditions

**center-zero met** point at the center of t

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it produces a direct voltage y into electrical energy. 2. A direct voltage by converting energy; for example, a solar unit that produces a variable resistance varies with illumination. 5. In corrosion potential that is response of an anode and a cathode and electrically bonded may be separate metals metal. The different metals potential that is accompanied in this cell involves an electronic processes, it is referred to geographic area served by a receiver. A cellular system's multiple cells.

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mobile telephone system into small cells, each nitter. A telephone call one transmitter to the signal as a vehicle moves divided and frequencies Method of mobile telecommunication service s. The cellular approach

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utilizes low-power transmitters that allow uninterrupted communications through sophisticated switching equipment linking the cells. This system, by reusing frequencies and standardizing service and equipment, has substantially improved mobile telephone service.

**cellulose acetate**—An inexpensive transparent plastic film used as the backing material for many recording tapes.

**cellulose-nitrate disc**—See lacquer disc.

**Celsius temperature scale**—Also called centigrade temperature scale. A temperature scale based on the freezing point of water defined as 0°C and the boiling point defined as 100°C, both under conditions of normal atmospheric pressure (760 mm of mercury).

**cent**—A measure of frequency, defined as equal to 100th of a semitone.

**center-fed antenna**—An antenna in which the feeder wires are connected to the center of the radiator.

**center feed**—1. Attaching feeder wires or a transmission line to the center of the radiator of an antenna. 2. Connection of signal input terminals to the center of a coil.

**center frequency**—Also called resting frequency. 1. The average frequency of the emitted wave when modulated by a symmetrical signal. 2. The frequency at the center of a spectrum display (for linear frequency scanning). It is usually tunable. 3. Also called free-running frequency. The frequency at which a phase-locked loop operates when not locked onto an incoming (input) signal.

**centering control**—One of two controls used to shift the position of the entire image on the screen of a cathode-ray tube. The horizontal-centering control moves the image to the right or left, and the vertical-centering control moves it up or down. See also framing control.

**centering diode**—A clamping circuit used in some types of plan-position indicators.

**centering magnet**—A magnet that centers the televised picture on the face of the tube. Also called framing magnet.

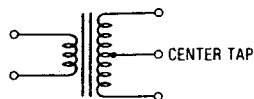
**center of gravity**—A point inside or outside a body and around which all parts of the body balance each other.

**center of mass**—On a line between two bodies, the point around which the two bodies would revolve freely as a system.

**center poise**—Scale of viscosity for insulating varnishes.

**center ring**—The part that supports the stator in an induction-motor housing. The motor end shields are attached to the ends of the center ring.

**center tap**—A connection at the electrical center of a winding, or midway between the electrical ends of a resistor or other portion at a circuit.



Center tap.

**center-tapped inductor**—An inductor that has a tap at half the total inductance.

**center wire**—A fine loop of wire used in proportional counters as an anode. A high voltage is applied to it to set the conditions for radiation measurement.

**center-zero meter**—A dc meter that has its zero point at the center of the scale, e.g., a dc galvanometer.

## cellulose acetate — centripetal force

**centi**—One hundredth ( $10^{-2}$ ) of a specific quantity or dimension.

**centigrade temperature scale**—The older name for a Celsius temperature scale in the English-speaking countries. Officially abandoned by international agreement in 1948, but still in common usage.

**centimeter waves**—Microwave frequencies between 3 and 30 GHz, corresponding to wavelengths of 10 to 1 centimeters.

**central battery exchange**—Manual telephone exchange in which a battery situated at the exchange is the source of current for operating supervisory signals, for subscribers' calling signals, and for the current required to enable a subscriber to speak over his or her line.

**central office**—The facility at which a communications common carrier terminates customer lines and locates the equipment for interconnecting those lines.

**central-office equipment**—Apparatus used in a telephone central office to furnish communication services.

**central-office line**—See subscriber line.

**central processing unit**—Also called central processor; abbreviated CPU. 1. The part of a computer system that contains the main storage, arithmetic unit, and special register groups. Performs arithmetic operations, controls instruction processing, and provides timing signals and other housekeeping operations. 2. A group of registers and logic that form the arithmetic/logic unit plus another group of registers with associated decoding logic that form the control unit. Most MOS devices are single-chip CPUs, in that the registers hold as many bits as the word length of the unit. With bit-slice devices, however, central processing units of any bit width can be assembled essentially by connecting the bit-slice parts in parallel. Externally, a bit-slice device will appear to be a coherent single CPU capable of handling words of the desired bit length. 3. That part of a computer system that controls the interpretation and execution of instructions. In general, the CPU contains the following elements: arithmetic and logic unit (ALU), timing and control, accumulator, scratch-pad memory, program counter and address stack, instruction register, and I/O control logic. 4. That unit of a computing system that fetches, decodes, and executes programmed instructions and maintains the status of results as the program is executed.

**central processor**—See central processing unit; CPU.

**central station**—A control center to which alarm systems in a subscriber's premises are connected, where circuits are supervised and where personnel are maintained continuously to record and investigate alarm or trouble signals. Facilities are provided for the reporting of alarms to police and fire departments or to other outside agencies.

**central station alarm system**—An alarm system, or group of systems, the activities of which are transmitted to, recorded in, maintained by, and supervised from a central station. This differs from proprietary alarm systems in that the central station is owned and operated independently of the subscriber.

**centrex**—1. A service offered by telephone companies. It uses central-office equipment to provide features comparable with those provided by a PBX. 2. An improved PBX system that also provides direct inward dialing (DID) and automatic number identification (ANI) of the calling PBX station.

**centrifugal force**—The force that acts on a rotating body and that tends to throw the body farther from the axis of its rotation.

**centripetal force**—The force that compels a rotating body to move inward toward the center of rotation.



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## sequential lobing — serial programming

**sequential lobing**—A direction-determining technique utilizing the signals of overlapping lobes existing at the same time.

**sequential logic**—1. A circuit arrangement in a computer in which the output state is determined by the previous state of the input. *See also* combinatorial logic. 2. Part of a circuit in which the output values are a function of the inputs and data stored within the circuit.

**sequential logic element**—A device that has one or more output channels and one or more input channels, all of which have discrete states, such that the state of each output channel depends on the previous states of the input channel.

**sequential operating connector**—A form of connector that has two or more groups of contacts that open and close in a predetermined sequence. For example, a connector that is designated for use with ground connections, power distribution, and signal circuits. Operates in such a way that when the connector is closed, the ground contacts close first, power contacts second, and signal contacts last. This sequence is reversed when the connector is opened.

**sequential operation**—The carrying out of operations one after the other.

**sequential relay**—A relay that controls two or more sets of contacts in a predetermined sequence.

**sequential sampling**—Sampling inspection in which the decision to accept, reject, or inspect another unit is made following the inspection of each unit.

**sequential scan**—A system of TV scanning in which each line of the raster is scanned sequentially.

**sequential scanning**—In television, rectilinear scanning in which the distance from center to center of successively scanned lines is equal to the nominal line width.

**sequential switcher**—A device that automatically permits the viewing of pictures from a number of CCTV cameras on one CCTV monitor in a selected sequence.

**sequential timer**—A timer in which each interval is initiated by the completion of the preceding interval. All intervals may be independently adjusted.

**sequential with memory**—*See* SECAM.

**serial**—1. Pertaining to time-sequential transmission of, storage of, or logical operations on the parts of a word in a computer—the same facilities being used for successive parts. 2. The technique for handling a binary data word that has more than one bit. The bits are acted upon one at a time, analogous to a parade passing a review point. 3. Typically refers to a port on a computer for transmitting one bit at a time. Modems and mice typically connect to a serial port.

**serial access**—1. Pertaining to transmission of data to or from storage in a sequential or consecutive manner. 2. Pertaining to the process in which information is obtained from or placed into storage with the time required for such operations dependent on the location of the information most recently obtained or placed in storage. *See also* random access.

**serial adder**—A device in which additions are performed in a series of steps: the least significant addition is performed first, and progressively more significant additions are performed in order until the sum of the two numbers is obtained.

**serial arithmetic unit**—In a computer, a unit in which the digits are operated on sequentially. *See also* parallel arithmetic unit.

**serial bit**—Pertaining to computer storage in which the individual bits making up a word appear in time sequence.

**serial computer**—A computer having a single arithmetic and logic unit.

**serial counter**—Also called ripple-through counter. A counter in which each flip-flop cannot change state until after the preceding flip-flop has changed state; relatively long delays after an input pulse is applied to the counter can occur before all flip-flops reach their final states.

**serial data**—Data transmitted sequentially, one bit at a time.

**serial digital computer**—A computer in which the digits are handled serially. Mixed serial and parallel machines are frequently called serial or parallel, according to the way the arithmetic processes are performed. An example of a serial digital computer is one that handles decimal digits serially, although the bits that comprise a digit might be handled either serially or in parallel. *See also* parallel digital computer.

**serial interface**—1. A data channel that transfers digital data (1s and 0s) in a serial fashion, one bit after another. Serial interfaces save space by requiring fewer lines compared with parallel interfaces, but at the sacrifice of data transfer speeds. 2. A port that sends or receives the eight bits in each byte one by one, much like beads on a string. Printers located far from a computer usually require a serial interface.

**serial I/O**—A method of data transfer between a computer and a peripheral device in which data is transmitted for input to the computer (or output to the device) bit by bit over a single circuit.

**serialize**—To convert from parallel-by-bit to serial-by-bit.

**serially reusable routine**—A computer routine in main storage that can be used by another task following conclusion of the current use.

**serial memory**—1. A memory in which information is stored in series and reading or writing of information is done in time sequence, as with a shift register. Compared with a RAM, a serial memory has slow to medium speed and lower cost. *See* sequential-access memory. 2. A memory whose contained data is accessible only in a fixed order, beginning at some prescribed reference point. Data in any particular location is not available until all data ahead of that location has been read. Such a memory is inherently slow compared with a random-access memory.

**serial mode**—A type of computer operation that is performed bit by bit, generally with the least significant bit handled first. Read-in and readout are accomplished bit after bit by shifting the binary data through the register.

**serial operation**—1. In a digital computer, information transfer such that the bits are handled sequentially, rather than simultaneously as they are in parallel operation. Serial operation is slower than parallel operation, but it is accomplished with less complex circuitry. 2. Type of information transfer within a programmable controller whereby the bits are handled sequentially rather than simultaneously, as they are in parallel operation. Serial operation is slower than parallel operation for equivalent clock rate. However, only one channel is required for serial operation.

**serial-parallel**—Having the property of being partially serial and partially parallel.

**serial port**—A method of data communication in which bits of information are sent consecutively through one wire.

**serial printer**—A device that can print characters one at a time across a page.

**serial processing**—The sequential or consecutive execution of more than one process into a single device such as a channel or processing unit. Opposed to parallel processing.

**serial programming**—Programming of a digital computer in such a manner that only one arithmetical or logical operation can be executed at one time.